ANALYSIS OF 2006 MAINE EMERGENCY DEPARTMENT USE

A Study Conducted on Behalf of the Emergency Department Use Work Group of the Maine Advisory Council on Health System Development

Beth Kilbreth
Carolyn Gray
Tamar Chitashvili
Muskie School of Public Service

And

Karl Finison
Maine Health Information Center

February 2009

Report funded by a grant from
The Maine Health Access Foundation

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This study, conducted on behalf of the Emergency Department Use Work Group of the Maine Advisory Council on Health System Development provides an analysis of visits to hospital emergency departments in Maine that took place in 2006. The study relied on two sources of data: a comprehensive file of hospital discharge records provided by the Maine Health Data Organization; and comprehensive claims records for most privately insured residents in Maine and most MaineCare members. The 2006 data used for this analysis pre-dated some of the initiatives undertaken by the Department of Human Services to improve access to primary care and reduce emergency department use among MaineCare members. Therefore, some of the rates of use reported here may have changed.

The study was a collaborative undertaking of the Maine Health Information Center and the Research Institute of the Muskie School, University of Southern Maine.

Key findings with regard to emergency department (ED) use are summarized below.

- Maine's emergency department use in 2006 was, in aggregate, about 30% higher than the national average.

- Maine's rate of use in every age cohort was higher than the national average for the same age cohort. Maine conformed to national patterns in having the highest rates of emergency department use among infants and the very old. However, the age groups where Maine's experience was most disproportionate compared to national norms was among 5 to 14 year olds and 15 to 25 year olds. These age cohorts, while atypical in their rates of use, represent a small portion of overall ED use.

- The highest prevalence of frequent ED users (4 or more visits in a year) is found among infants, and 19 to 24 year olds.

- Use of emergency department care for outpatient care by MaineCare members is more than three times as high (918 outpatient visits per 1000) as rates of use by privately insured residents (284 per 1000). Over half of frequent outpatient ED users are covered through MaineCare. Rates of admissions of MaineCare members associate with emergency department visits suggest that part of the higher use is associated with adverse risk selection in the MaineCare population.

- The uninsured are responsible for 9 percent of emergency department visits. ED visits by uninsured patients are concentrated among young adults. Between the ages of 15 and 44, 15 percent of emergency department visits are generated by the uninsured. Use rate by the uninsured is low in other age cohorts.

- Rate of emergency department use varies substantially by health service area, with the highest use service area having a rate almost 90 percent above the state average and the lowest use area having a rate 26 percent below the state average. . High rates of geographic variation in emergency department use (for both MaineCare and private insurance members) suggest that health system factors that are not well understood contribute to high rates of use in some areas.

- Geographic variation in emergency department use rates is seen among both privately insured and MaineCare members with substantial overlap of high and low use areas for these two populations, suggesting that use rates are affected by area-specific health system factors that affect the total population.

- Because MaineCare rates of emergency department use are so much higher than privately insured populations, an area's use rate is also affected by the proportion of MaineCare members in the population.

- A review of diagnoses frequently seen in emergency departments in Maine suggests that a substantial number of visits are made for conditions that could be appropriately treated in office or clinic settings.

1. Introduction

Maine's Advisory Council on Health System Development was given a charge by the 2008 legislature to study rising health care costs in the State of Maine, determine cost drivers, and make recommendations to the legislature on policy interventions that might mitigate the rate of increase in health care spending. In response to this charge, the Council established a Work Group to study hospital emergency department (ED) utilization and, based on an analysis of ED utilization patterns, to make recommendations for policy interventions targeted to improved efficiency and quality of care in emergency department care in Maine. A list of members of the Workgroup is included in the Appendix 1.

To assist the Work Group in their undertaking, the Maine Health Access Foundation provided grant funding to support a study of ED use based on analysis of a complete record of 2006 Maine hospital discharge data and 2006 claims data for privately insured Mainers and MaineCare Program participants. The results of this analysis, undertaken by the Research Institute of the Muskie School, University of Southern Maine and the Maine health Information Center, are presented in this report. In addition, the report summarizes information regarding ED use from national studies and, where possible, compares Maine experience with national norms.

National Emergency Department Trends

Nationally, the annual number of emergency department visits increased by 20 percent in the decade following 1995, reaching a total of 115.3 million visits in 2005 or 396 visits per 1000 persons.[1] This trend represents an average increase of more than 1.7 million additional visits each year.[2] During this same period, the number of facilities – hospital emergency departments – *decreased* from 4,176 to 3,795. The combination of a reduction in capacity and an increase in numbers of visits resulted in a sharp increase in utilization per facility – a 31 percent increase over the decade to a rate of about 30,000 visits per ED in 2005.[3]

Some portion of the increase in ED use can be characterized as an improvement in the availability of health care services to US residents. The National Institute of Medicine report on Hospital-Based Emergency Care, for example, characterizes EDs as "…an impressive public health success story in terms of access to care. Americans know that it is available 24 hours a day, 7 days a week."[4] The trend also reflects an increased capacity to provide trauma care, which constitutes 35 percent of ED visits and is the most prevalent cause of mortality among people between the ages of 1 and 44.

However, the sharp increase in utilization per facility has placed a substantial strain on the health care system as can be seen in terms of increased waiting times and diversion of patients to other facilities. According to a national survey, 73 percent of hospitals reported boarding two or more patients in the emergency department - some for longer than 48 hours – because of unavailability of inpatient beds. Overcrowding led to 501,000 ambulances being diverted from their original hospital destination to an alternative facility in 2003.[5] Overcrowding also leads to very long waits for care for individuals whose conditions are not life threatening but who need medical attention.

A major part of the problem of over-crowding in hospital emergency departments can be attributed to demands placed by patients without emergency medical conditions. Because there

is no generally accepted protocol for defining non-emergency or preventable ED visits, especially in studies relying on retrospective data analysis, reports vary widely in estimates of the distribution of visits by acuity level. The National Hospital Ambulatory Medical Care Survey for 2005 found that only 15 percent of ED visits required immediate care (at the point of, or within 15 minutes of arrival). Patients triaged as needing to be seen within 15 to 60 minutes (urgent care needs) constituted 33.3 percent of visits, those requiring care within 1 to 2 hours (semi-urgent care) made up another 20.7 percent and non-urgent care (triaged as able to be postponed for 2 to 24 hours) constituted 14 percent. For the remaining 16 to 17 percent of visits the triage status was not known or no triage system was used. Thus, by this measurement system, 17 percent of visits were avoidable and could have awaited treatment in an office setting and another 50 percent, while needing same-day treatment, may have been appropriate for care in alternative settings.[6]

A New York study using a different classification system found that 42 percent of visits were for non-emergency care, and that among visits classified as requiring immediate care, 36 percent of the children and 32 percent of the adults could have had their care needs attended to in primary care settings. Further, among the visits classified as emergent, 34 percent of children's and 27 percent of adults' visits were characterized as preventable with proper primary care and health care management.[7]

Chronic illnesses can be a major contributor to ED visits that fall in the category of requiring immediate care but preventable with proper primary care. Nationally, there have been countervailing trends with regard to rates of visits for differing chronic conditions. Overall, the percentage of visits related to chronic illnesses for adults has declined over the past 10 years. Specifically, ED visits related to chronic obstructive pulmonary disease, ischemic heart disease, asthma, congestive heart failure, cerebrovascular disease and cancer have declined. However, visits related to hypertension and depression have increased significantly.[8]

Reasons for Increased ED Usage

National studies cite a number of factors associated with the increased rate of ED use, particularly for non-emergent care. Accessibility, both financial and physical, relative to alternative sites is considered an important driver. Federal law requiring emergency departments to treat patients regardless of ability to pay (Emergency Medical Treatment and Labor Act) and 24-hour access policies have contributed to the trend toward use of EDs for non-emergent care. As might be expected, the rate of use of EDs by uninsured patients is proportionately higher than for privately insured patients. However, the rate of *increase* in use in recent years has been higher among insured populations.[9] One hypothesis regarding the increases among insured patients is that increased patient cost-sharing in the form of deductibles and copayments has led some insured patients – like the uninsured – to seek "free" care. In one study, 15 percent of patients cited financial barriers to care as the reason for visiting the emergency department.[10] With regard to physical inaccessibility, in this same study, fully half of ambulatory patients making ED visits reported making their visit because of non-availability of primary care clinicians on nights and weekends, difficulties with making appointments, long waiting times or geographic and transportation barriers.[11] A second study, based on a convenience sample survey of ED visitors at two hospitals had similar findings. Respondents cited difficulties getting appointments or waits that were too long for appointments in office settings. In addition, the ED was seen as the appropriate source for care after hours and patients felt that medical reassurance about a "worrisome" condition, particularly for pediatric visits, merited the attention of ED providers.[12]

Importance of Diverting Non-emergent Care from Emergency Departments

The use of emergency departments for non-emergent care results in numerous problems. As cited earlier, overcrowding compromises the availability of ED providers for true emergency cases – a dangerous compromise in quality of care. In addition, because of the significant overhead costs associated with hospital care, emergency department treatment is substantially more expensive than office-based treatment of illnesses and injuries that can be managed in office settings. For example, a study in Maine found that for six diagnoses frequently seen in Emergency Departments but usually treated in office settings,[*] the average cost in the ED was more than five times the average cost for office based care for these same conditions.[13] Assuring access to care in alternative settings could generate substantial savings to the health care system. Finally, care in an emergency department is of necessity fragmented. ED providers frequently do not have access to medical histories, medical records and prior test results for patients who self-refer to EDs. They must rely on patients' self-reports with regard to their use of medications. A patient who makes a repeat visit is likely to be treated by a different provider than on the first visit. The emergency department, with its mission of providing immediate short-term crisis intervention in medical emergencies is a particularly inappropriate setting for individuals with chronic illnesses who need care management, periodic monitoring, patient education related to self-care, and a team approach to treatment.

Because of the importance both to improving quality in health care services and to mitigating health care costs, The Maine Council on Health System Development established a workgroup to develop recommendations regarding emergency department use. This report presents the results of analyses commissioned by the workgroup to better understand the specific dynamics of ED use in Maine and includes recommendations for next steps.

The report includes the following: section 2 explains the methodology used in the analyses reported; section 3 presents findings on ED use for the Maine population as a whole, and for the Maine population divided by insurance status; section 4 presents findings on ED use by different age groups; section 5 presents ED use by different health service areas within the state; section 6 presents analyses focused on identifying the components of ED use that may be avoidable; and the final section summarizes key findings and presents the recommendations for next steps.

[*] The six diagnoses included: sore throat (strep), conjunctivitis, external and middle ear infections, upper respiratory infections, bronchitis, and asthma.

2. Study Methods

The purpose of this study was to understand patterns of hospital emergency department use in Maine. The focus was on outpatient emergency department use. However, emergency department visits resulting in inpatient hospitalization were also evaluated. Two sources of data were used.

- Project researchers analyzed 2006 Maine Health Data Organization (MHDO) hospital reports providing information on all emergency department visits for all users of Maine hospitals including uninsured patients. This database, which includes Medicare, Medicaid, privately insured, and self-pay patients (and others) provides a full-year record of all Maine emergency department visits. Excluded from our analysis are emergency department visits made to Maine hospitals by non-residents – visitors from out of state or cross-border patients.

- Second, the researchers separately analyzed private insurance and MaineCare claims for emergency department visits in Maine in 2006. This data source allowed us to calculate area-specific and age-specific rates of use for these two populations, to determine numbers of visits per ED user, and to look at rates of use of office/clinic-based health care in relation to ED use. The MaineCare analysis excluded individuals who are dually eligible for MaineCare or other insurance since, for those individuals, the claims record of emergency department use would not be complete.

The MHDO hospital reports contain the most complete record of emergency department visits and allow us to evaluate the experience of uninsured, self-pay, and Medicare participants as well as privately insured individuals and MaineCare members. The claims data, available at the time of this study, only for privately insured and MaineCare members, allows the calculation of area-specific rates of use and the relationship between emergency department utilization and other health service use such as office visits.

The numbers of visits and individuals contained in these two data sources are not totally aligned. There are several reasons for this. Hospital discharge summaries are based on "expected" source of payment which sometimes is not the same as the final and actual payment source. Some hospital reports, for example, which register a private health insurer as the expected payment source represent services that are ultimately covered through an automobile insurance policy or other alternative insurance policy. Not all payers are required by law to submit claims data to the Maine Health Data Organization. The claims data is truncated at age 64 so individuals over this age will not appear in the private insurance claims data file even though many individuals over age 65 continue to have private coverage. Similarly for the MaineCare population, some individuals have dual coverage and the "expected" payer on the hospital summary data may not conform with the actual payer. Finally, individuals' status changes over the course of a year. Some change from public insurance to private or the converse, some uninsured may gain coverage, and some may lose coverage. The population estimates by payer presented for the state as a whole, inclusive of Medicare populations and the uininsured, are drawn from point-in-time surveys. The claims based comparisons of the privately insured and Medicaid populations are based on the average number of members per month – a number that is substantially lower than a count of all who participated in MaineCare or who had private insurance at some point during 2006. We detail these differences to answer questions regarding the apparent discrepancies between tables where one table is based on

MHDO hospital data and the other on claims data. While the specific counts vary depending on the data source, the relative experience of the different groups is consistent from analysis to analysis and the differences do not change the analytic conclusions of the report.

Methods of identification of emergency department visits and other visit types were consistent with methods used nationally. Detail on this methodology is included in Appendix 2. Data were extracted for all visits with dates of service between January 1, 2006 and December 31, 2006. This time period was the most recent for which a complete record of utilization was available at the time of the study.

The study was restricted to residents of Maine. Visits to Maine hospitals by residents of other states or countries were not included.

Definitions of Study Variables

Emergency department visits were tabulated by age group, gender, Hospital Service Area (HSA) and source of payment. Definitions used are described briefly below. Detail is provided in Appendix 2.

- *Hospital Service Area (HSA)*

  There are 32 hospital service areas in Maine comprised of the towns surrounding a hospital location where the plurality of residents' care is received at that hospital. When two hospitals are located in the same town or city, they share a service area.

- *Source of Payment*

  The expected source of payment coding available on the hospital discharge records was aggregated into five groups as follows: Medicare, Medicaid, Privately Insured, Uninsured, and Other. Privately insured includes individuals with employer-based health plans, and individually purchased health insurance coverage. The category of Other includes Workers Comp and Champus/USVA Military.

- *Emergency Department Visit*

  Emergency Department visits were identified using standard coding systems for hospital billing: Uniform Billing (UB) Revenue Codes or CPT Codes (Current Procedural Terminology). Both of these systems include multiple codes that refer to emergency department care. The comprehensive list of codes applied in this study follows the system developed by the National Committee for Quality Assurance (NCQA) Health Effectiveness Data Information Set (HEDIS).[14] This method assured that this study's findings with regard to Maine could be compared to national studies of ED use and was the approach approved by the Emergency Department Use Work Group.

  Outpatient emergency department visits that did not result in a hospitalization and visits that resulted in a hospitalization are reported separately. Throughout the report, where the term "outpatient emergency department (ED) visit" is used, the data excludes visits that result in a hospital admission.

  Codes that refer to "urgi-center" visits provided in a hospital setting are included in the count of ED visits, in conformance with national ED study protocols.[15] However, to determine the extent to which these visits influenced the analysis of ED visit rates by hospital service area,

the codes for these visits were analyzed separately as well. The small number of visits falling in this category did not influence the findings the study. The specific analysis is attached as Appendix 2.

- *Diagnosis*

  The clinical diagnosis associated with each ED visit was assigned using the ICD-9-CM (International Classification of Diseases, Ninth Revision) code available on the hospital discharge data and administrative claims.

- *Frequent Users*

  Frequent users are defined as individuals who make four or more visits to an ED over the course of a year. While there is no nationally accepted definition of frequent user, the four visit standard was used in two different studies, one study of Utah experience and another of New Hampshire experience[16] and was approved by the ED Use Work Group.

Analysis Methodology

Three types of analysis are presented in this study: percent distributions of ED visits; population rates of use of the ED; and evaluation of ED visits that might be preventable if health care were available in alternative settings. These methods are described, briefly, below.

Distributions

Percent distributions analyses in this study provide information on the characteristics of the population that made ED visits or on the distribution of the visits, themselves. No information is provided with regard to larger population groups inclusive of persons who did not make an ED visit. The percent distribution of ED visits is analyzed according to the following factors:

- Percent of total ED visits attributable to different age groups;
- Percent of total ED visits attributable to different payer groups (private, Medicare, MaineCare, Other, and uninsured);
- Percent of total ED visits attributable to different hospital service areas; and
- Percent of total ED visits attributable to frequent users (four or more visits in one year) vs. infrequent users.

Rates of Use

Rates of use are calculated as the number of ED visits generated by a given population divided by the number of people included in the population. This information provides insight into the health use patterns of the larger populations to which ED users belong. The rates are presented in terms of number of ED visits for every 1000 persons.

Identification of Avoidable Visits

There is no nationally accepted protocol for categorizing ED visits as avoidable or necessary based on retrospective analysis of hospital discharge data or claims data. Therefore, the Work Group did not adopt a categorization protocol. Two analyses were conducted to generate lists of representative diagnoses that had a high probability of appropriate treatment in non-ED settings.

One protocol identified diagnoses that generated more than 2000 visits each, statewide, over the course of the year and that each had a hospitalization rate of less than 5 percent. Using this screening protocol, approximately 219,000 ED visits in Maine in 2006 were identified. The diagnoses and numbers of visits are presented in Appendix 3.

A second protocol identified potential diagnoses for avoidable visits by reviewing the diagnoses seen in a Maine walk-in clinic on a week-end. While many of these patients may not have resorted to an ED visit in the absence of the clinic availability, their use of the walk-in clinic on a weekend without an appointment reflects a self-perceived need for immediate medical evaluation or care. The diagnoses treated in this non-hospital setting identify conditions amendable for non-ED-based management.

These two lists of diagnoses were reviewed for overlap to identify high volume ED diagnoses where creation of alternative treatment options might safely reduce ED volume. Because the diagnosis codes identified using these two protocols lack specificity in defining avoidable visits – that is, other diagnoses, not included may also represent avoidable visits – and sensitivity – that is, the list may include diagnoses which in certain circumstances represent truly emergent conditions, the report section on avoidable visits presents information suggestive of further analysis but is not conclusive.

3. Maine Emergency Department Use Statewide Patterns

Overall Emergency Department Use

By several measures, Maine's use of emergency department (ED) services outpaces national use. Out of a population of 1,321,505[17] people in Maine, thirty-percent (390,709 people) had an outpatient ED visit in 2006. Four percent of the population (50,808 people) had an ED visit that resulted in an inpatient hospitalization. While approximately one in three Mainers used the emergency department for outpatient services (visits not resulting in a hospitalization) nationally, one in five individuals had an ED visit (inclusive of visits resulting in an admission).[18] Maine's population rate of ED use, inclusive of ED visits resulting in a hospitalization was 532 per 1000 persons in 2006. This rate is substantially higher than the national 2006 rate of 405 visits per 1000 persons. Maine's population rate of ED visits resulting in inpatient hospitalization was 50 per 1000 persons.*

Emergency Department Use by Payer

Among payer groups in Maine, the privately insured have the lowest rates of outpatient ED visits (284.4 per 1000) while MaineCare, with a rate more than three times as high as the privately insured, has the highest (918.7 per 1000). Medicare's visit rate (565 per 1000) falls between the Medicaid rate and the private insurance rate.

Table 1: Emergency Department Use Rates by Expected Payer, 2006

	Total	Medicaid (MaineCare)	Private Insurance	Medicare	Uninsured	Other[1]
Population Denominator	1,321,505	223,857	733,678	236,184	127,786	
Total Outpatient ED Visits	638,160	205,661	208,688	133,440	60,280	30,091
Total ED Visits Resulting in Inpatient Hospitalization	65,499	8,893	14,437	37,406	2,694	2,069
Outpatient ED Visit Rate Per 1000	482.9	918.7	284.4	565.0	471.7	
ED Visits Resulting in Inpatient Hospitalization, Rate per 1000	49.6	39.7	19.7	158.4	21.1	

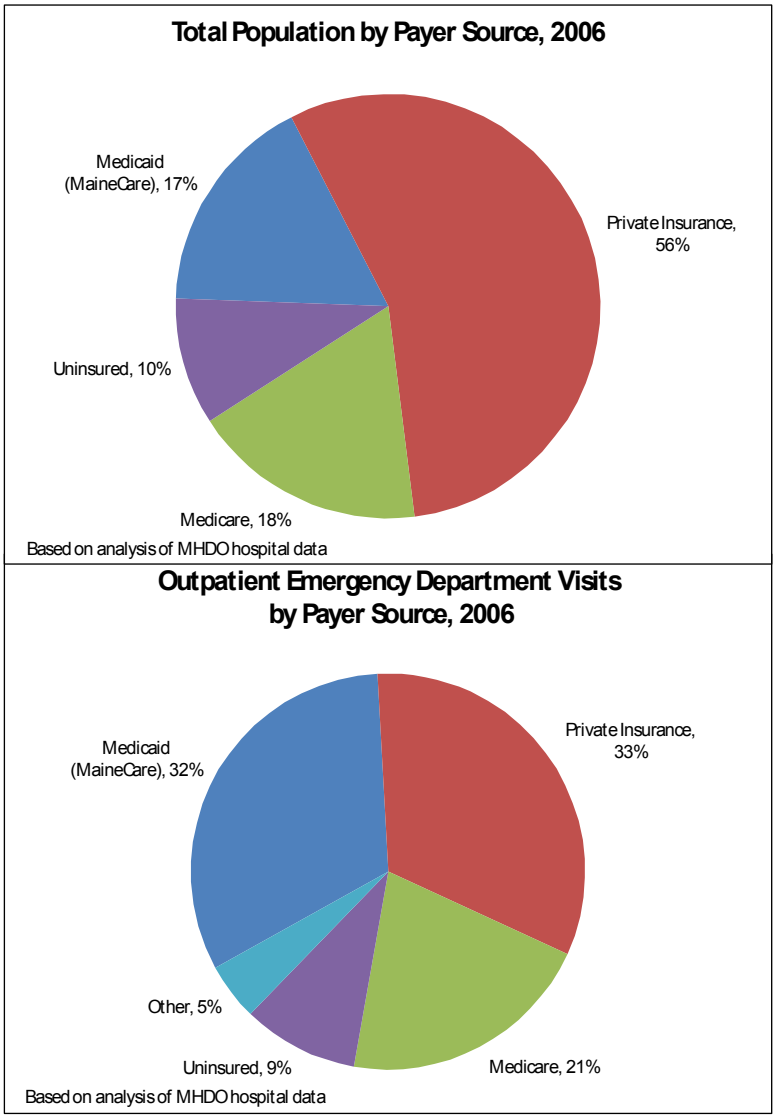
* Generally, in this report, separate figures and rates are provided for outpatient ED visits and visits resulting in an admission. Because national data combines outpatient and inpatient ED visits, we report a combined rate for the purpose of comparison with national norms.

[1] Other includes Workers Comp and Champus/USVA Military. **Medicaid(MaineCare) is payer of last resort. Therefore, persons with dual Medicaid/Medicare status would be identified as Medicare as principal source of payment not Medicaid. MHDO payer codes used Medicare (pay=1), Medicaid(pay=2) Private Insurance (pay=5,6), Uninsured (pay=7,8), Other (pay=4,9,11)

However, the hospitalization rate from ED visits for Medicare is 158.4 per 1000 (a ratio of 1 hospitalization for every 3.5 visits) compared to a hospitalization rate of 49.6 per 1000 for Medicaid (a ratio of 1 hospitalization for every 23 visits), suggesting that more of Medicare's ED use can be attributed to truly emergent conditions. Overall, fifty-seven percent of ED visits resulting in inpatient hospitalization were covered through Medicare.

This study focused on outpatient emergency department visits that did not result in an inpatient hospitalization. Figure 1 shows the distribution of the population in Maine by payer group compared to the distribution of outpatient ED visits by expected payer in 2006. Members in the MaineCare Program who constitute about 17 percent of the overall population (excluding MaineCare members who are dually eligible for Medicare) generated 32 percent of emergency department visits. Privately insured individuals make up 56 percent of Maine's population and were responsible for 33 percent of ED visits. The 18 percent of Maine's population covered through the Medicare program generated 21 percent of ED visits. Finally, the uninsured are responsible for ED visits in proportion to their numbers. The uninsured made up about 10 percent of the population in 2006 and generated 9 percent of ED encounters.

Figure 1: Distribution of Maine's Total Population by Insurance Coverage Compared to the Distribution of Outpatient Emergency Department Visits by Insurance Type



Comparing Rates of Use for MaineCare and Privately Insured Populations*

Table 2, below, is based on analysis of claims data for privately insured Maine residents and MaineCare enrollees for the year 2006. Because some people do not remain enrolled for a full year, the total population numbers reported below show the average total enrollment in any month – a number substantially lower than a count of all persons with coverage at any point during the year. Therefore, totals differ from those reported in Table 1 which reflect insurance status of Maine's population at a point in time. Because claims data include a complete record of covered health care used by enrolled members, it allows an analysis of ED use in relation to use of office or clinic visits. Rates are reported in terms of the number of ED visits made for every 1000 individuals.

During 2006, about 6 percent (98,087) of privately insured individuals and 45 percent of MaineCare members (90,903) had at least one outpatient ED visit. The rate of use by the privately insured population was about 230 visits per 1000 insured persons, compared to a rate of about 978 per 1000 for the MaineCare population.

Table 2: Emergency Department Use by Maine's Privately Insured and MaineCare Participants: Summary

	Privately Insured Population	MaineCare Population
Average monthly enrollees	588,058	201,058†
Members with an ED visit	98,087	90,903
Percent making an ED visit	16.7%	45.2%
Rate of ED visits/1000	229.7	977.8
Percent of visits resulting in admission	5.1%	4.3%
Rate of ED admissions/1000	12.4	44.4
Number of office/clinic visits	1,772,099	941,012
Rate of office visits per person	3.0	4.7
Ratio of office visit/ED outpt.vis.	13 to1	4.8 to1

Based on analysis of claims data

In 2006, the rate of ED visits resulting in an admission to the hospital was 44.4 per 1000 persons among MaineCare recipients, compared to 12.4 per 1000 for the privately insured population. This disparity suggests that the MaineCare program has a substantially higher proportion of seriously ill or injured individuals than does the privately insured population. Nevertheless, because of the high overall rate of ED use in the MaineCare population, the percent of ED visits culminating in an admission was slightly lower (4.3 percent) among MaineCare enrollees than among the privately insured (5.1 percent).

---

* Claims data analyses were conducted only for privately insured populations and MaineCare. The uninsured do not generate claims, since they have no insurer. Medicare claims are in a federal data base which becomes available for analysis at a later date than state data and 2006 data was not available at the time of this study.

†. This number includes MaineCare members with full benefits who are not dually eligible for MaineCare and do not have any other health insurance coverage.

The privately insured population, in 2006, made 13 office or clinic visits for every outpatient ED visit incurred. By comparison, the MaineCare population made about 5 office visits for every ED visit. On average, the privately insured had 3 office/clinic visits per person and MaineCare enrollees had close to 5 such visits per person.

Frequent Emergency Department Users by Expected Payer Group

For the purposes of this study, individuals who made four or more outpatient visits to an emergency department during 2006 are defined as frequent ED users. In Maine, 2 percent of the overall population were frequent users of the ED. Among persons with any ED visits, seven percent (26,283) were frequent users.

.

Over half (53%) of frequent outpatient ED users are covered through MaineCare. The uninsured population accounts for 15% of frequent ED use. Frequent users make up 6 percent of Medicaid recipients who have any ED use. This proportion is double the prevalence found in the Medicare Program and among the uninsured, and three times the prevalence among the privately insured.

Table 3: Prevalence and Distribution of Frequent Emergency Department Users by Payer Group.

	Number of Frequent Outpatient Emergency Department Users (4 or more outpatient visits)	Population Prevalence of Frequent Emergency Department Users	Percent of ED Users who are Frequent Users	Distribution of Frequent Emergency Department Users
Total	26,283	2%	6.7%	100%
Commercial	6,442	1%	4.1%	25%
Medicaid (MaineCare)	13,800	6%	12.4%	53%
Medicare	7,682	3%	10.3%	29%
Uninsured	4,018	3%	9.4%	15%
Other	1,856		7.7%	7%

Based on analysis of MHDO hospital data

Comparing Frequency of Use, Privately Insured and MaineCare

Table 4, below, provides additional detail on the breakout of ED use among the MaineCare population and the privately insured in Maine. Eighty-five percent of privately insured individuals in Maine did not have an emergency department encounter in 2006, compared to 59 percent of MaineCare recipients. While 35 percent of MaineCare enrollees visited an ED between one and three times in 2006, 15 percent of the privately insured used the ED at this level. Less than one percent of privately insured persons had four or more ED visits compared to 6 percent of MaineCare enrollees. Among frequent users, MaineCare enrollees had a higher average number of visits (6.6 on average per person) than did privately insured frequent users (5.6 per person average). The combination of the higher proportion of frequent ED users and their higher rate of use is evident in the overall distribution of ED visits within the two populations. While fully 40 percent of all ED visits were generated by the 6 percent high users in the MaineCare population, only 11 percent of overall visits among privately insured patients were generated by high users.

Table 4: Comparison of ED Use by Frequent Users and Infrequent Users, MaineCare and the Privately Insured

	Percent Distribution of population	Percent Distribution of Visits	Rate of Use per 1000 Enrollees
MaineCare			
0 visits	59%		
1-3 visits	35%	60%	1,670
4+ visits	6%	40%	6,628
Privately Insured			
0 visits	85%		
1-3 visits	15%	89%	1,378
4+ visits	0.5%	11%	5,632

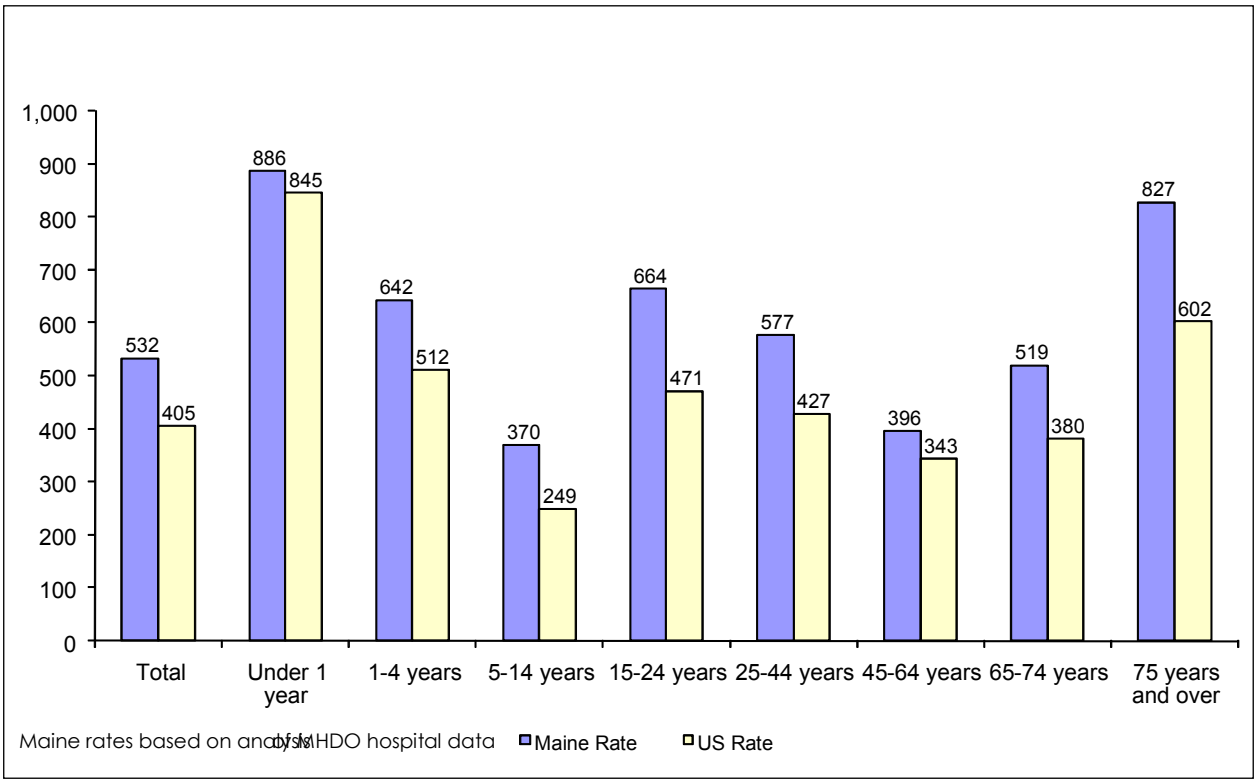
Based on analysis of claims data

4. Emergency Department Use by Age

Maine Use in Comparison to National Average Use by Age*

Maine's population use rate is higher than national average use rates in every age group. Across all ages, Maine's rate is 31 percent higher than the nation's. † In Maine, the highest ED use rates are among the very young - under one year of age and the very old – age 75 and older (Figure 2). This age distribution comports with national patterns and would be expected based on the distribution of life-threatening illnesses in the population at large. Comparisons of Maine to the nation, however, reveal several discrepancies in other age cohorts. The largest differences between Maine and the nation are among older children and young adults, where Maine's rates are 48.6 percent and 41.0 percent higher than national rates, respectively (table 5) While the differences in the rates in these age groups are substantial, visits attributable to these age cohorts, both nationally and in Maine, represent a small portion of total ED use.

Figure 2: Maine Emergency Department Visit Rate per 1000 Compared to US NHAMCS Rate 2006 (includes both outpatient ED visits resulting in inpatient hospitalization)



Maine also has a substantially higher (37.4 percent) use rate among persons over age 75. This difference cannot be attributed to the high proportion of Maine's population that is elderly, since

* The analysis in Figure 2 combines outpatient ED visits with ED visits resulting in an admission. The combined data corresponds with the way national ED data are reported, allowing direct comparisons.

† The national population is, on average, more urban than is Maine's population on average. Urban areas have a larger supply of office based providers and, thus, lower ED use rates, on average, than rural areas. Thus, part of the difference in Maine rates compared to national rates may be attributed to Maine's rurality.

the rate, both nationally and in Maine, is calculated within the demographic group, and thus the denominator in each case consists only of persons over age 75. We do not know whether the difference can be explained by a higher morbidity rate in Maine's elderly population or differences in health service use patterns.

Table 5: Maine Excess Emergency Department Use by Age, Compared to National Average Rates

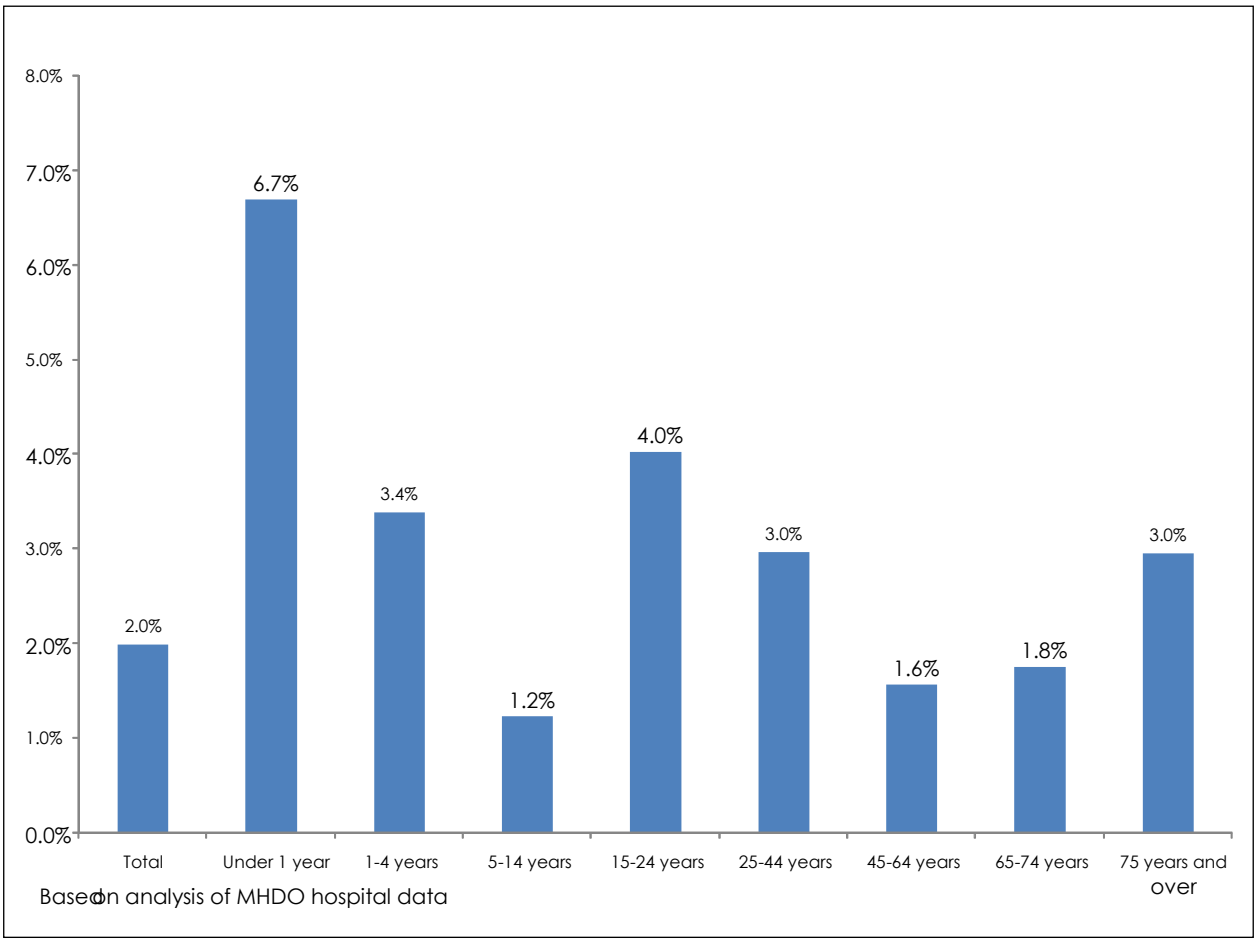
Age	National ED Use Rate per 1000 Persons	Percent by Which Maine Use Rate Exceeds National Rate
< 1	845	4.9%
1-4	512	25.4%
5-14	249	48.6%
15-24	471	41.0%
25-44	427	35.1%
45-64	343	15.5%
65-74	380	36.6%
75+	602	37.4%
Average, all ages	405	31.0%

Proportion of Frequent Outpatient ED Users within Age Cohorts

When the proportion of frequent ED users (4 or more outpatient ED visits in a year) within each age group is examined, we see that infants and 15 through 24 year-olds have the highest proportions (Figure 3). The age cohort of 15 through 24 is generally a population that uses few health care services. The significant proportion of frequent ED users of this age in Maine may merit further investigation. Among 5 to 14 year-olds – the group whose use rate in Maine is highest in comparison to national averages – the proportion of frequent users is very low – less than 2 percent. This suggests that Maine's unusual use rate in this age group is driven by a higher prevalence of ED use in the age group rather than by small numbers of individuals making frequent visits.

Based on volume 6,757 frequent outpatient ED users were children age 0-18, 21,413 were adults age 19-64, and 4,548 were persons age 65 and older.

Figure 3: Maine 2006 Prevalence of Frequent ED Use by Age

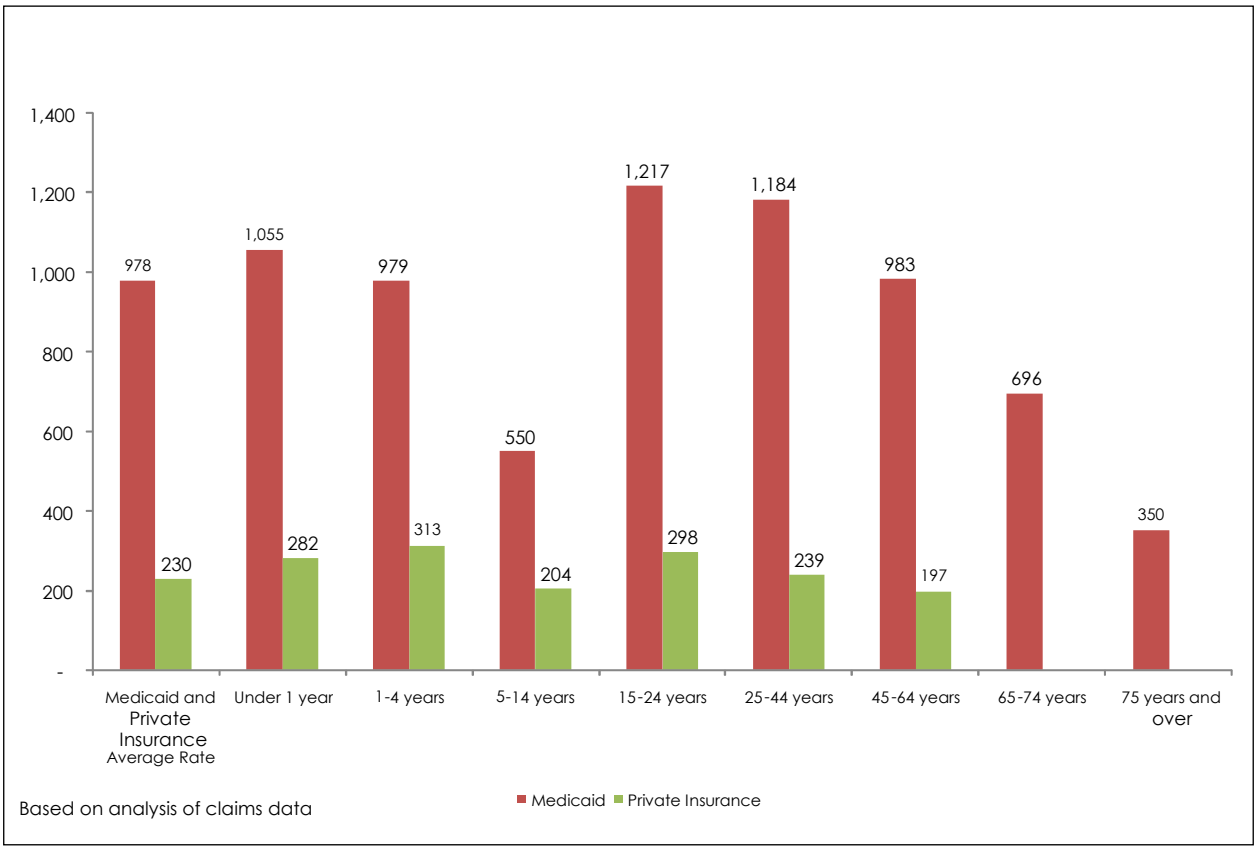


ED Use by Age Cohort for MaineCare Members and Privately Insured Mainers

Figure 4 shows rates of outpatient ED use by different age groups for privately insured Mainers and members enrolled in the MaineCare program. Among MaineCare recipients, the highest rate of use is among 15 to 24 year-olds, followed by adults between the ages of 25 and 44.[*] In the privately insured population, the highest rate of use is between the ages of one and 4, followed closely by 15 to 24 year-olds.[†] The relatively high rates among both privately insured and MaineCare members in the teenage and young adult ages help explain Maine's elevated rate in this cohort compared to national norms.

[*] MaineCare rates of use among persons over age 65 look very low because most MaineCare members in this age group have Medicare coverage as well as MaineCare coverage. When Medicare is the payer for ED visits in these cases, the visits will not be reflected in the MaineCare numbers.
[†] The private insurance claims data excludes persons over age 65 so no ED visits are reported for this group.

Figure 4: Maine Emergency Department Outpatient Visit Rate per 1000 by Age and Expected Payer Source, 2006



Because the data was not available to calculate population-based rates of emergency department use by age cohorts for the uninsured and Medicare populations we looked at the distribution of visits by age and payer group to understand the relative contribution of each age group (table 6). Table 6 shows that MaineCare program participants are over-represented in every age cohort up through age 44. While MaineCare provides coverage to about 17 percent of Maine's population,[19] 68 percent of ED visits among infants, for example, are generated by Medicaid recipients. Privately insured populations, on the other hand, are under-represented in every age cohort. While 56 percent of Maine's population has private insurance coverage, generally, between one in five or one in three ED users are privately insured, depending on the age cohort. The two exceptions are in the age cohort of 5 through 14 and 45 through 64, where 43 percent and 47 percent, respectively, of ED users are privately insured. Medicare coverage, of course, is almost universal in the population over age 65 and, as logically follows, Medicare is the source of payment for the vast majority of visits above this age. The uninsured in Maine constitute just under 10 percent of the population and, interestingly, consume ED care in exact proportion to their representation in the population, at large (9 percent of total visits).

This pattern mirrors national experience, where the uninsured population (approximately 17 percent of U.S. residents) generate 16.7 percent of ED visits.[20] In Maine the uninsured are under-represented in childhood age cohorts and overrepresented among young adults. Fifteen percent of ED visits among 15 through 44 year olds are generated by the uninsured. Nevertheless, close to half of ED visits among 15 through 24 year olds are attributable to Medicaid program participants and another third to the privately insured. Similarly in the 25

through 44 group, Medicaid participants and the privately insured contribute about one third of the visits, each.

The concentration of uninsured ED visits among young adults may derive from the high risk of uninsurance in this age group and a lack of medical home for this population. The over-representation of MaineCare recipients among ED users in both pediatric and adult populations could be indicative of access barriers to office-based care, a result of particular difficulties this population faces in fitting care needs into regular office hours (whether driven by job demands or transportation restrictions), or habituation to use of the ED when alternative sources are available.

The 5 through 14 age group was identified earlier in the report has having rates of ED use significantly out of line with national norms. The substantial representation of privately insured children in this cohort (along with high MaineCare representation) suggests that the factors driving an unusually high ED use rate in this age group extend across all socioeconomic demographics pointing, perhaps, to a unmet need for primary care and urgent care services for children dependent on parents for transportation and parents unable to take time during usual working hours to transport children to medical appointments

Table 6: Distribution of Outpatient Emergency Department Visits Among Age Cohorts by Source of Payment, 2006

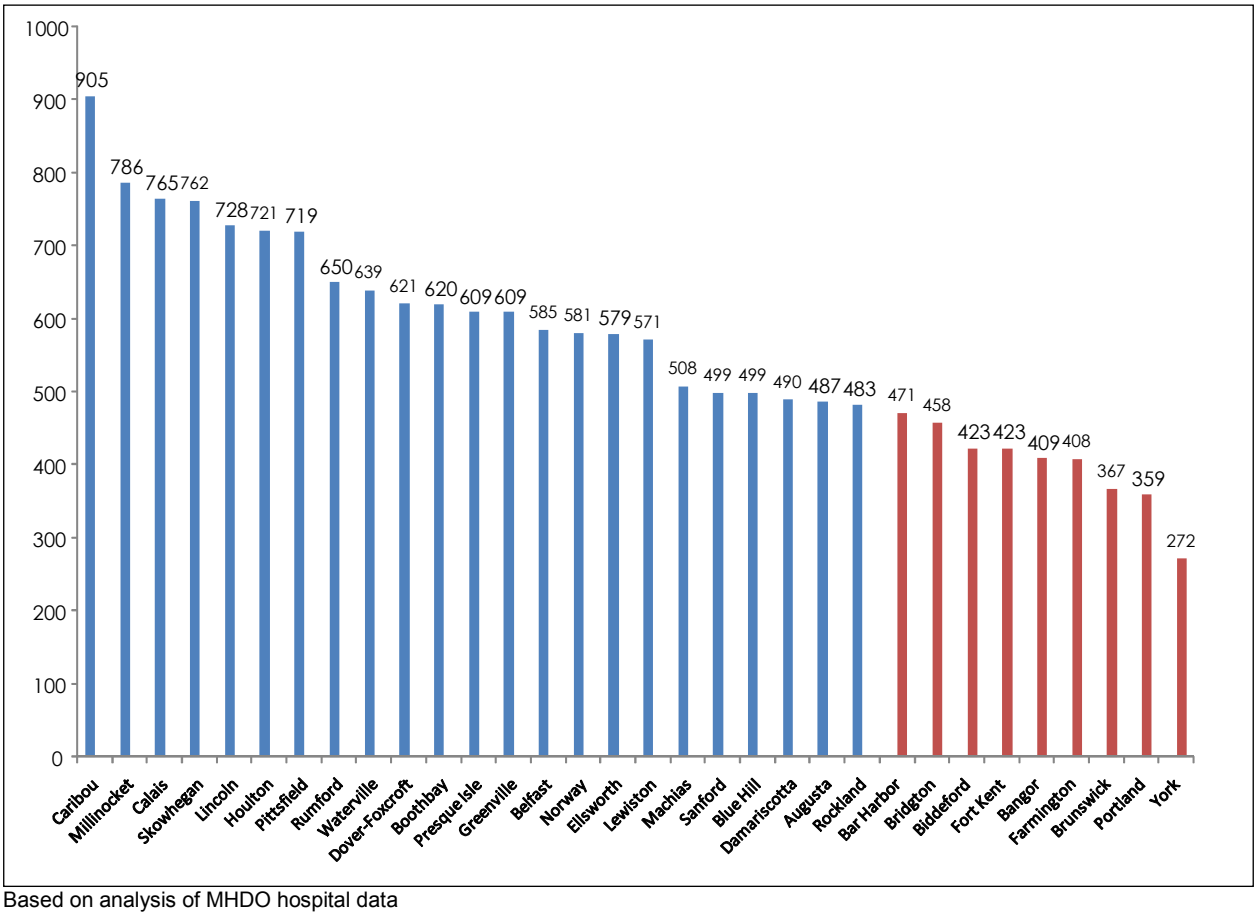
Payer (% of total state population)	Total	<1	1-4	5-14	15-24	25-44	45-64	65-74	75+
Total	638,160	11,690	34,001	55812	117,910	189,101	132,887	39,663	57,096
Medicaid (MaineCare) (16.9%)	32%	68%	61%	50%	46%	37%	18%	1%	1%
Commercial (55.5%)	33%	23%	32%	43%	32%	33%	47%	11%	7%
Medicare (17.9%)	21%	1%	1%	1%	2%	10%	20%	84%	91%
Uninsured (9.7)	9%	5%	3%	4%	15%	15%	8%	0%	0%
Other	5%	3%	3%	2%	5%	6%	6%	3%	1%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Based on analysis of MHDA hospital data

5. Emergency Department Use by Hospital Service Area

In 2006, the overall rate per 1000 outpatient ED visits in Maine was 482.9. In Figure 5, below, health service areas with outpatient ED use rates higher than the state average are displayed in blue and those at or below the state average are displayed in red. There is substantial variation in use rates, with the highest service area having a rate close to 90 percent above the mean and Portland having a rate 26 percent below the mean. It should be noted that York rates are an inaccurate reflection of ED use in that service area because of the study decision to exclude non-Maine residents from the analysis. York is an area which experiences substantial cross-border health service use.*

Figure 5: Maine 2006 Outpatient Hospital Emergency Department Visit Rates per 1000 by Hospital Service Area (age – standardized)



Based on analysis of MHDO hospital data

As displayed in Figure 5, a majority of hospital service areas had a higher rate than Maine's overall average. Large population centers in several of the low rate service areas skew the mean resulting in a larger number of services areas on the above average "side" and a smaller

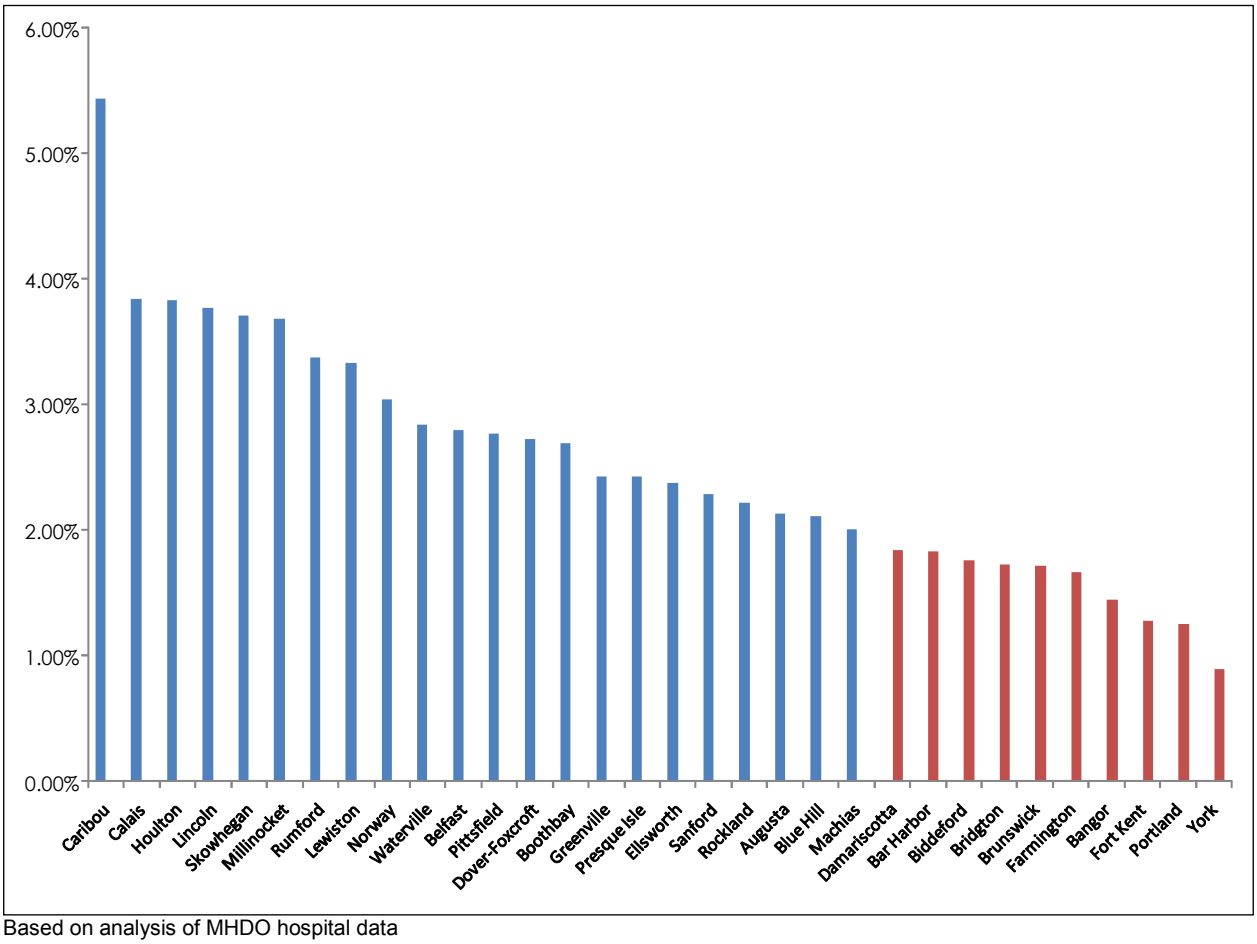
* Although MHDO hospital discharge data for York is incomplete due to cross-border utilization, the analysis of rates of use by MaineCare and privately insured individuals in York revealed York to be an average to low ED use rate service area. See Figures 8 and 9.

number below the average experience. Populous areas have a higher concentration of health care providers which may lower the ED use rates in these areas. However, the representation of several rural communities in the below average group indicates that physician concentration is not the only factor that explains high or low ED use in a community.

Proportionate Distribution of Frequent Outpatient ED Users by Service Area

In the Maine population as a whole, 2 percent were frequent users in 2006 (making 4 or more visits). Figure 6, below, shows the proportion of high users for each health service area. Service areas with a higher proportion of frequent users than the state average are shown in blue and those at or below the state average are shown in red. When comparing outpatient ED rates per 1000 (Figure 5) to the prevalence of frequent users by hospital service area, it is evident that there is substantial overlap between service areas with high general ED use rates and areas with higher proportions of frequent users.

Figure 6: Maine 2006 Prevalence of Frequent Emergency Department Use by Hospital Service Area



Based on analysis of MHDO hospital data

Table 8 below, shows by service area, the percent of the population with any outpatient ED visit. Ten service areas (excluding York) have populations where the proportion who did not use an ED at all is above the state average. The service areas with low numbers of ED users and low numbers of frequent users are essentially the same service areas.

The congruence of areas that have low numbers of ED users *and* low numbers of frequent users suggests that high overall use rates (Figure 5) are driven *both* by higher general population use of ED services (Table 8) *and* by higher percents of frequent users. The two factors are separate phenomena. High users are a small subset of the overall population who may be seriously ill (sometimes with mental illness). High population participation in ED use suggests use of the ED for non-emergent purposes either due to barriers to primary or urgent health care services or to inappropriate health seeking behavior. The high correlation of the two phenomena by service area suggests the need for further analysis of area-specific factors that may contribute to high ED use.

Table 8: Percent of HSA Population with an Outpatient ED Visit

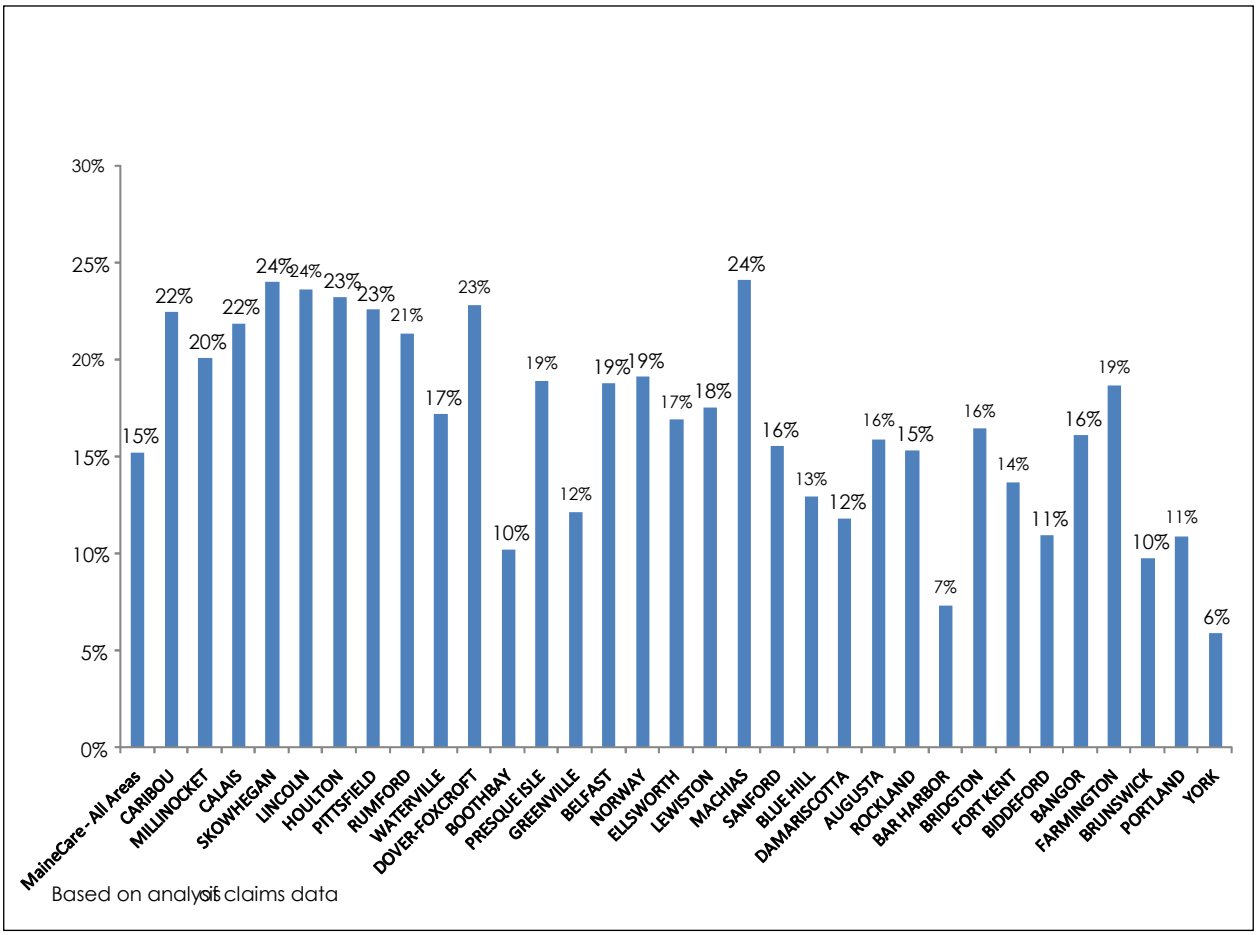
Hospital Service Area	Population Estimate	Persons with Any Outpatient ED Visits	Percent of Persons with Any Outpatient ED Visits
Pittsfield	15,386	7,225	47%
Caribou	17,057	7,785	46%
Skowhegan	28,965	12,617	44%
Millinocket	7,962	3,394	43%
Calais	12,867	5,444	42%
Lincoln	13,108	5,427	41%
Waterville	72,460	28,770	40%
Presque Isle	24,828	9,830	40%
Houlton	18,874	7,311	39%
Dover-Foxcroft	19,775	7,499	38%
Rumford	15,816	5,757	36%
Boothbay	6,281	2,263	36%
Greenville	2,468	884	36%
Norway	24,861	8,690	35%
Ellsworth	25,386	8,829	35%
Belfast	22,493	7,687	34%
Machias	16,260	5,276	32%
Lewiston	121,611	38,618	32%
Augusta	61,435	18,800	31%
Damariscotta	12,082	3,690	31%
Blue Hill	11,110	3,386	30%
Sanford	35,224	10,431	30%
Bridgton	18,530	5,360	29%
Bar Harbor	11,402	3,249	28%
Rockland	49,255	13,858	28%
Bangor	131,548	36,938	28%
Fort Kent	14,710	4,120	28%
Farmington	33,874	9,260	27%
Biddeford	74,963	19,846	26%
Portland	265,702	64,178	24%
Brunswick	74,200	17,519	24%
York	61,012	10,677	17%

Rates of Use by Health Service Area for MaineCare Enrollees and the Privately Insured

Because rates of ED use among MaineCare members are substantially higher than those of privately insured members, variation from health service area to health service area could be a function of having a high or low MaineCare patient base in a particular service area. To test this relationship, we looked separately at rates of use, within each service area, of MaineCare members and privately insured residents, and also at the proportion of the population in each service area that has MaineCare coverage.

Figure 7, below, shows the percent of the population with MaineCare coverage by health service area.

Figure 7: MaineCare Population by Hospital Service Area, Ordered by Outpatient Emergency Department Use Rate (highest to lowest), 2006



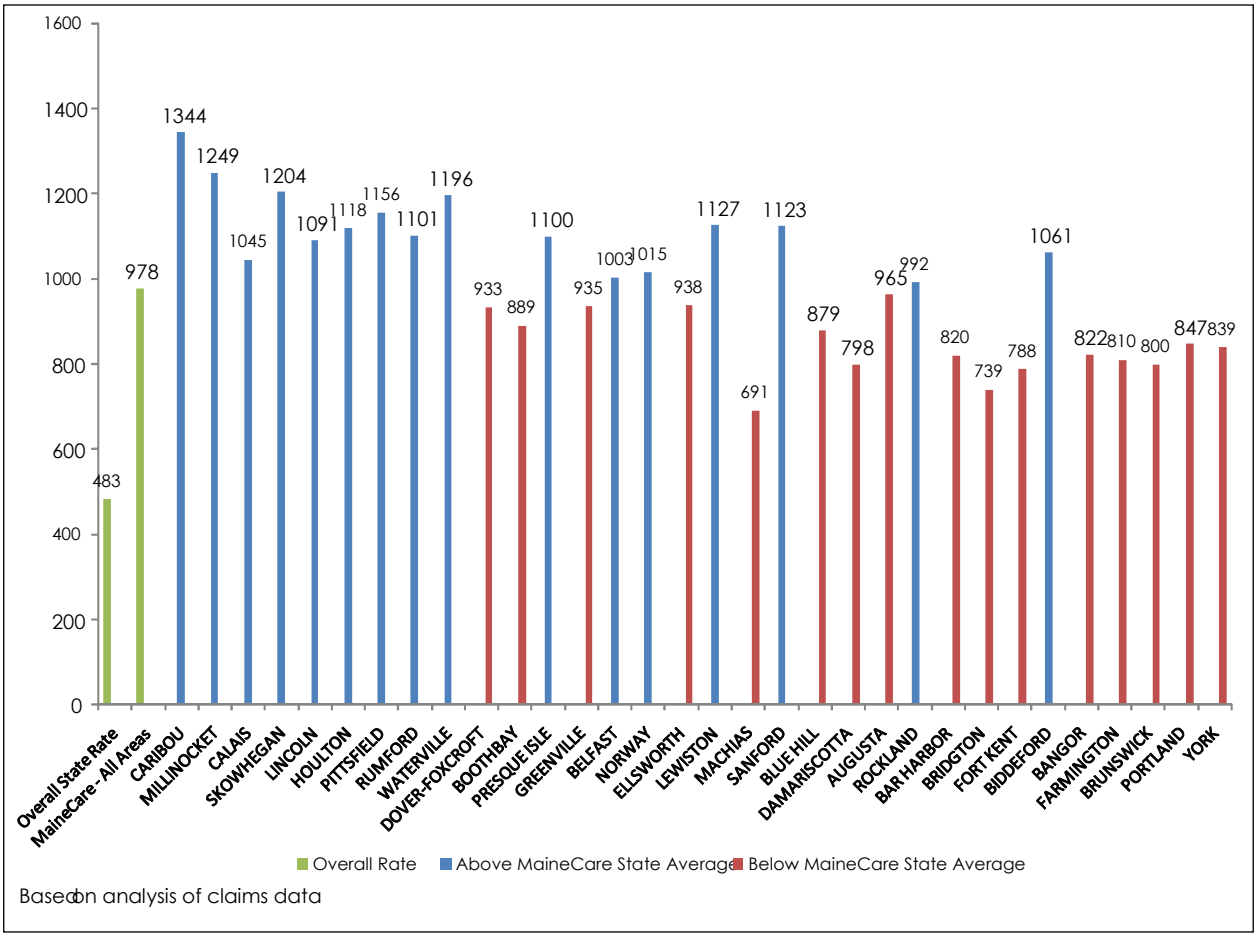
Excludes MaineCare members with dual eligibility for the Medicare Program or other insurance.

The health service areas are ranked in order of their overall ED use rates, from highest to lowest (in conformance with Figure 5). Figure 7 suggests that there is some relationship between concentrations of MaineCare enrollees and high ED use health service areas. The relationship is far from exact, however. Machias, for example, which has one of the highest concentrations of MaineCare enrollees (one in four area residents) has an overall ED use rate that is only slightly above the state average and Farmington, also with a relatively high proportion of MaineCare residents has among the lowest ED use rates in the state (see Figure 5

for total average ED rate per Health Service Area). Conversely, Boothbay, which has a relatively low concentration of MaineCare residents (10 percent), has an ED use rate well above the state average.

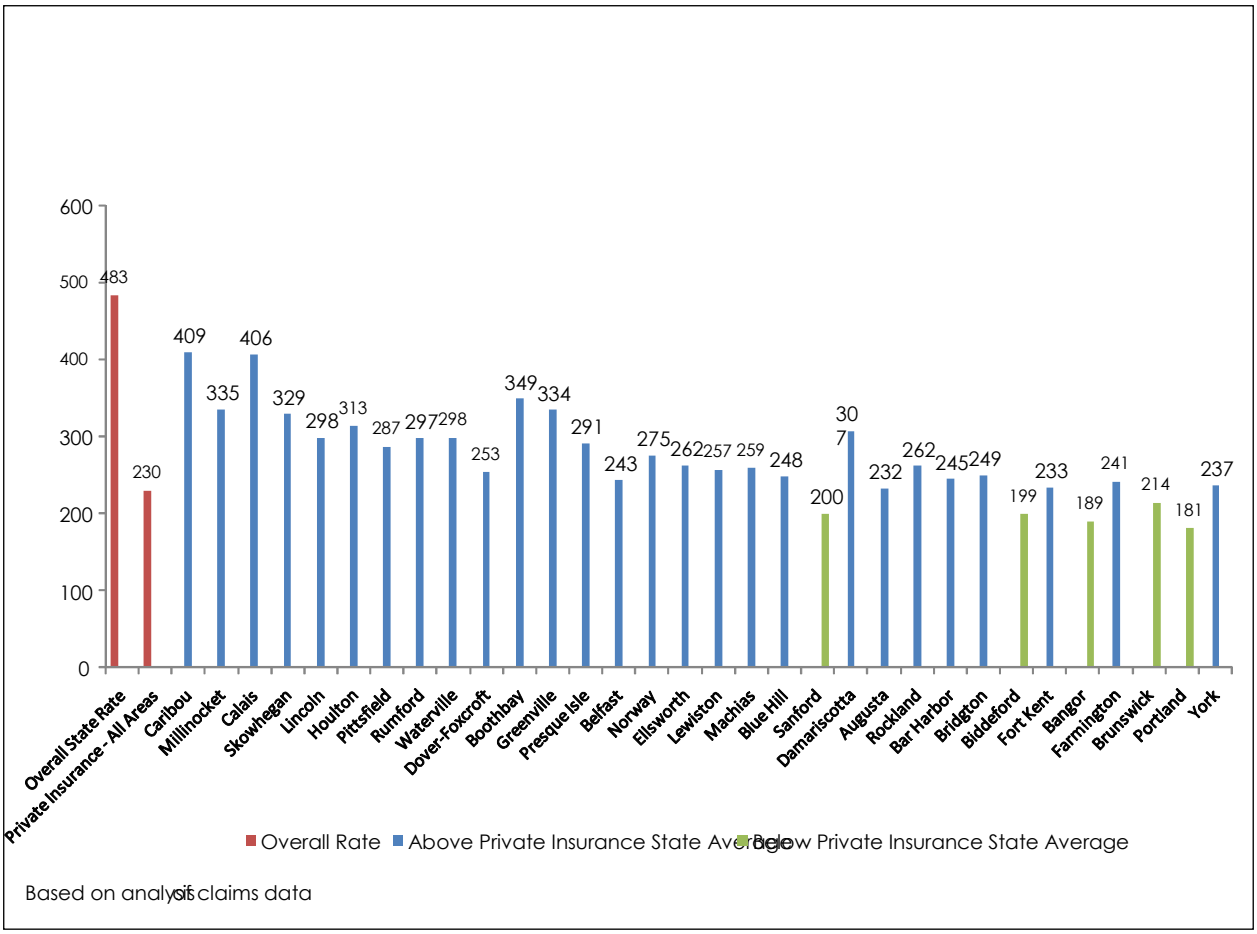
An alternative hypothesis regarding area specific differences in ED use is that health system characteristics may play a role in determining overall use. Such factors might be the availability of primary care providers or the availability of after hours urgent care. If factors external to population mix have a strong influence on ED use rates, one would expect rates for the privately insured and the MaineCare populations to be higher in the same health service areas and lower in the same health service areas. Figures 8 and 9, below, compare these rates. The health service areas are presented in the same order in each figure (ranked by their overall ED use rate, from high to low). Those service areas with higher than average ED use rates for the group are shown in blue. Below average use service areas are in red.

Figure 8: MaineCare Outpatient Emergency Department Rate per 1000 by Hospital Service Area, Ordered by Total Outpatient Emergency Department Use Rate (highest to lowest), 2006



The use rate among MaineCare recipients shows a substantial amount of variation from service area to service area with the highest rate (in Caribou) almost double the rate in the lowest service area (Machias). The rankings generally mirror overall state experience with some clear exceptions.

Figure 9: Private Insurance Outpatient Emergency Department Rate per 1000 by Hospital Service Area, Ordered by Total Outpatient Emergency Department Use Rate (highest to lowest), 2006



Privately insured individuals' rates also show substantial variation by service area with, again, the highest (Caribou) being double the rate in the lowest use rate area (Sanford). The highest use rate areas for the privately insured and the MaineCare populations overlap substantially as do the lowest use areas. For example, of the ten health service areas with the lowest rates of ED use for each of the two populations, six overlap. Of the ten health service areas with the highest use rates for each of the two populations, five overlap. Some areas show substantial differences, however, between rates of use by privately insured patients compared to MaineCare recipients. Damariscotta and Boothbay, for example, have above average rates within the privately insured population and below average rates in the MaineCare population.

Taken together, these analyses suggest that the experience of each service area is influenced by complex factors. Because rates of ED use by MaineCare members are substantially higher than privately insured members, areas with substantial numbers of MaineCare members are likely to see higher use rates, on average. However, substantial variation in rates of utilization within the privately insured population and within the MaineCare population suggests that other factors are at play. Further, when high use and low use, relative to group average, correspond across the two populations, it suggests that health system factors, medical practice patterns, or availability of providers may be influencing the ED experience in different service areas for all regardless of insurance source.

6. Avoidable Visits

There is no nationally accepted protocol or algorithm for classifying ED visits as avoidable based on retrospective analysis of hospital discharge or claims data. In this study, we have attempted to estimate the volume of some ED visits that might have been appropriate for treatment in an office setting. To do so, we generated, first, a list of diagnoses (using ICD-9 diagnostic coding) frequently seen in the ED that have a very low rate of hospitalization. The list was limited to diagnoses that each generated more than 2,000 visits across Maine EDs in 2006, and where an admission to the hospital resulting from the ED visit occurred less than 5 percent of the time. (The complete listing of diagnoses meeting these criteria is attached as Appendix 4.) Next we generated a list of diagnoses seen on a randomly selected week-end in a non-hospital-based walk-in clinic in Maine. When the top 50 diagnoses seen in EDs were matched against the top 50 diagnoses seen in the walk-in clinic, there was a match of 21 diagnoses, or 42 percent. Table 9 below, lists the diagnoses seen in both settings and the total number of ED visits associated with each diagnosis in Maine EDs in 2006.

Table 9: Diagnoses Seen with High Frequency both in a Weekend Office Clinic and in Maine Emergency Departments

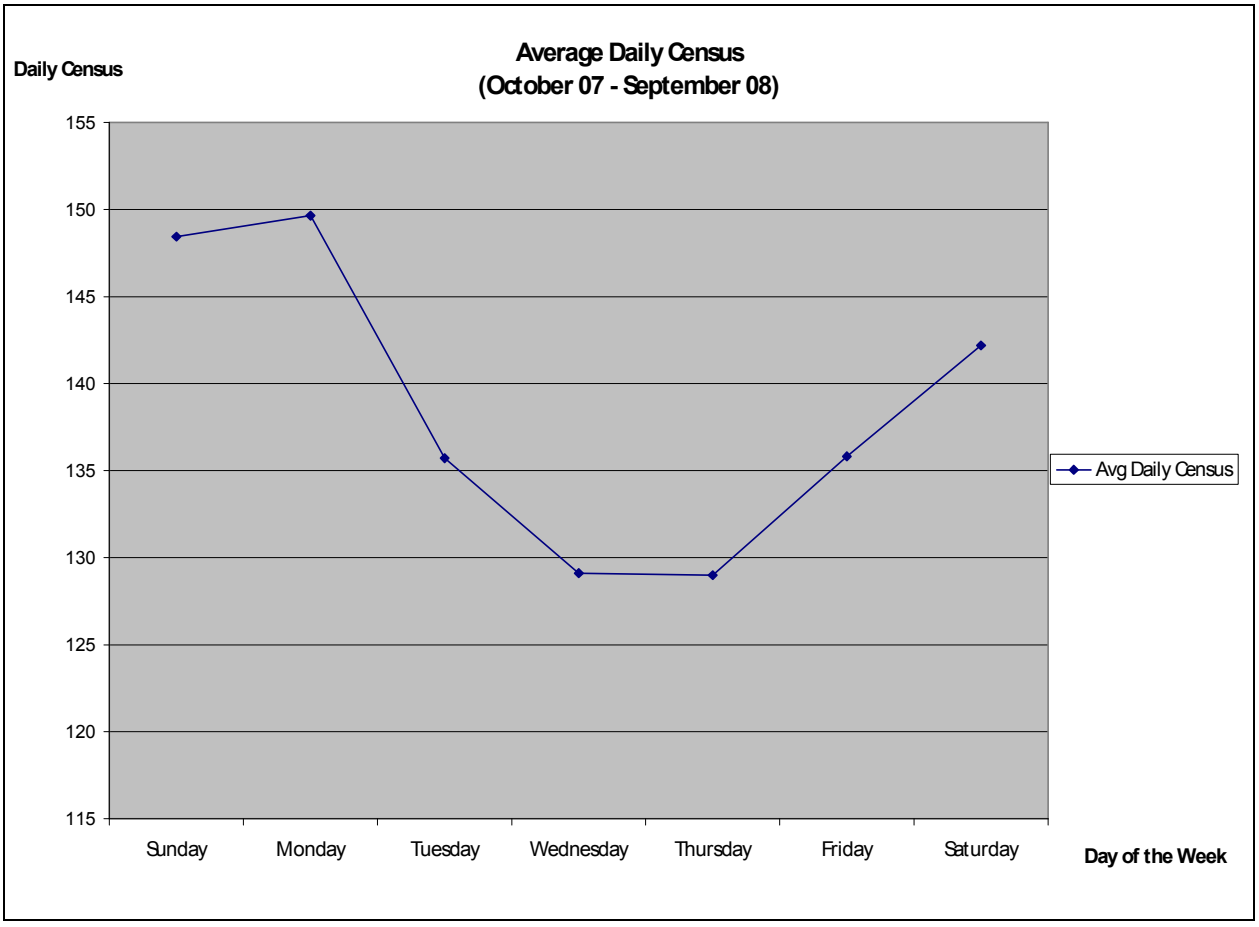
ICD9 Code	Description	Total Outpt. ED visits, 2006	Percent of Total Outpt.ED visits
462	Pharyngitis	12,817	2.0%
465.9	Upper resp. Infection	12,691	2.0%
729.5	Pain in soft tissue of limb	8,918	1.4%
784.0	Headache	8,543	1.3%
724.2	Lower back pain	8,123	1.3%
780.6	Fever	5,625	1.0%
466.0	Bronchitis, acute	5,490	1.0%
729.5	Pain in limb	5,398	0.8%
724.5	Back pain	4,994	0.8%
300.0	Anxiety disorders	3,973	0.6
034.0	Strep throat	3,862	0.6
493.9	Asthma	3,725	0.6%
372.3	Conjunctivitis	3,661	0.6%
782.1	Rash	3,261	0.5%
380.1	Otitis, external, acute	3,183	0.5%
692.9	Dermatitis	3,081	0.5%
719.91	Knee pain	2,865	0.4%
786.2	Cough	2,573	0.4%
461.9	Sinusitis, acute	2,562	0.4%
787.91	Diarrhea	2,400	0.4%
719.41	Shoulder pain	2,302	0.4%
TOTAL		110,042	17.2%

These diagnoses represent conditions which patients felt needed immediate evaluation but where they self-referred to an office setting when office-based care was available at the time they needed attention. As a random sample from two weekend days at one location in Maine, the list is hardly comprehensive. Nevertheless, just these diagnoses represent over 17 percent of annual ED visits. These data suggest that with greater understanding of the factors that propel individuals to emergency departments and interventions designed to reduce barriers to primary care sites, a substantial portion of ED use in Maine might be diverted to primary care sites.

Patient Volume over Time

Patterns with regard to peak ED visit volume provide additional suggestive information regarding the dynamics of emergency department use. Figure 10, below, shows, for one hospital in Maine, the volume of patients seen in the emergency department by day of the week. The daily count represents the average for each day of the week measured over the course of a year. The information is descriptive and suggestive, rather than definitive since the sample is limited to a single hospital. However, national studies have suggested similar patterns.

Figure 10: Average Number of Patients Seen Daily, 2007 – 2008 at One Maine Hospital



The experience at this hospital, as is true nationally, shows peak volume on Monday. Utilization drops during the mid-week and climbs throughout the weekend, with volume on Sunday at levels near those seen on Monday. The high use on weekends suggests two hypotheses. First,

many office practices are closed on weekends leaving patients with acute medical problems in some parts of the state with no alternative other than the hospital emergency room. A second factor that may contribute to the pattern could be delayed care seeking by individuals reluctant to lose time from work who wait until the weekend and then find that they cannot access office-based care.

The peak use on Monday is hypothesized, by some emergency department physicians, to result from pent-up demand created by patients who could not find (or who did not attempt to locate) a physician on the weekend. Many may have waited, expecting to see their own physician or to find a physician Monday when physician offices are normally operating, only to find they could not schedule an appointment until later in the week. Unwilling, at this point, to delay care any longer, these individuals seek services in the emergency department.

Figure 11: Average Number of Patients Registered per Hour at One Maine Hospital, 2007 - 2008

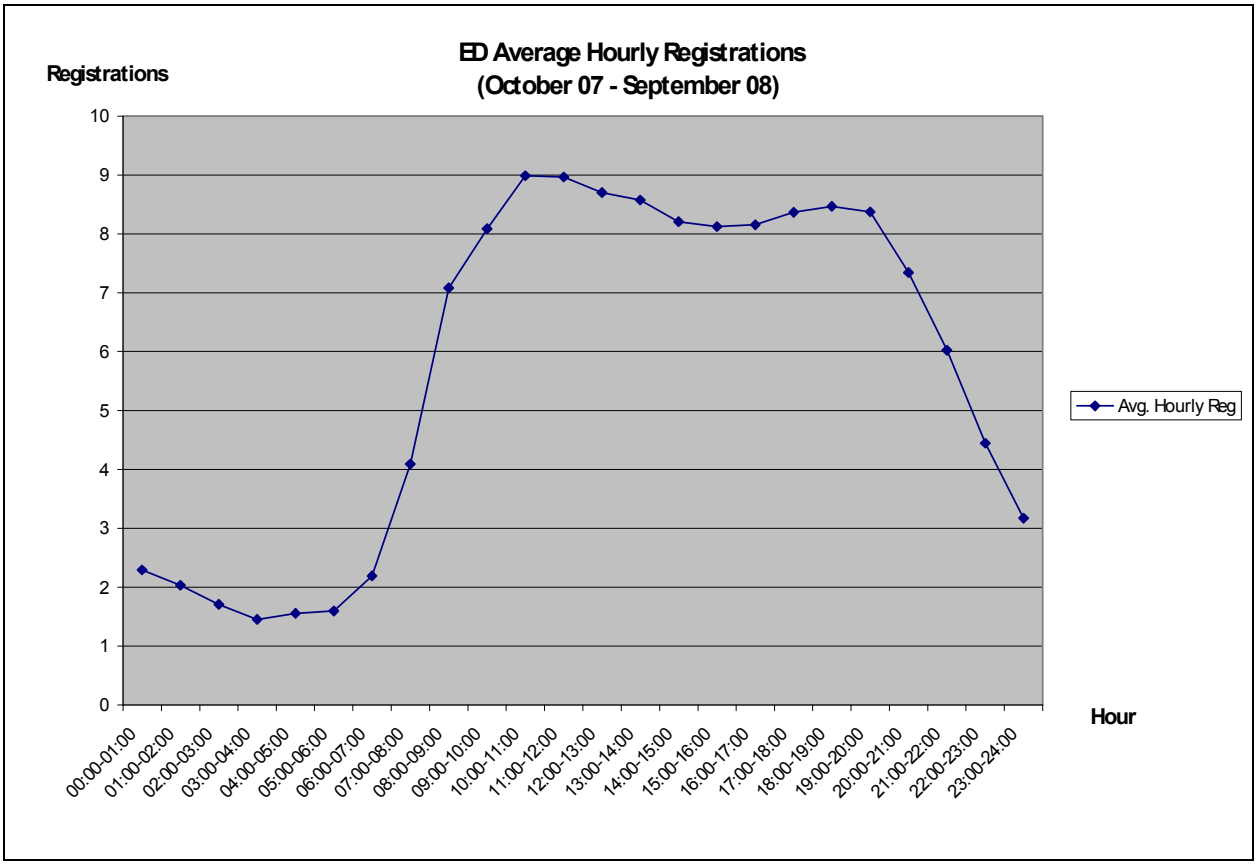


Figure 11 tracks the average number of patients per hour registering for treatment at an urban hospital emergency department in Maine in 2007 – 2008. The data indicate that volume is low late at night and in the early hours when most of the population is sleeping. The number of patients starts to rise precipitously between 6 AM and 7 AM and continues to rise until 10 AM. The arrival of new patients remains high throughout the afternoon, with a second, slightly lower peak between 6 PM and 7PM in the evening. During the later evening, arrival of patients drops precipitously again.

The high use of the ED during work and school hours suggests that most patients feel their problem is sufficiently urgent to require immediate assessment or care. The second peak of arrivals between 6 and 7 PM also suggests that some patients wait until after work to seek care, when most physician offices are closed.

Taken together, the pattern of frequently seen diagnoses and the pattern of ED use by day of week and hour, suggest that greater availability of same-day medical appointments in offices, walk-in clinic options, other urgent care venues and, possibly greater availability of telephone advice might provide a suitable alternative for a substantial portion of patients who currently seek care in emergency departments.

7. Discussion and Recommendations

Over the past decade, emergency rooms across the country have seen a rapid increase in the number of visits. Maine has not been immune from this trend and, in fact, currently has an average population-based rate of emergency department use 30 percent higher than the national average. Overall population use rates in Maine are higher than the national average in every age cohort and in every health service area in Maine except Brunswick and Portland.

Factors Associated with Age

While Maine's highest rates of ED use are among the very young (under 1 year of age) and the very old (75 and older), its rates are most elevated above national norms for 5 to 14 year-olds and 15 to 24 year-olds. Among the population in Maine with MaineCare coverage, rates of use are highest in the 15 to 24 age group with a rate of use 2 ½ times the national norm for this age group (inclusive of all payer groups and the uninsured). Uninsured ED users in Maine are also concentrated in the young adult category. In the school age group (5 through 14), MaineCare rates are double the national norm. However, 43 percent of visits in this age group in Maine occur among the privately insured.

MaineCare vs. Privately Insured

Based on the claims analysis, the rate of ED use by MaineCare recipients in every age group and every area of the state is substantially higher than that of privately insured individuals. The statewide average MaineCare ED use rate of 978 outpatient visits per 1000 persons is more than 4 times the average rate among the privately insured in Maine. MaineCare rates are particularly high throughout the adult years – five times the rate of privately insured in the ages between 25 and 64.

Some of the elevated rate in the MaineCare population can be attributed to frequent outpatient ED users. While only 6 percent of MaineCare enrollees had four or more outpatient ED visits in 2006, this group (who averaged close to 7 visits per person) generated 40 percent of MaineCare ED visits. The MaineCare population also had a substantially higher proportion of seriously ill or injured individuals in 2006. The rate of hospitalization following an ED visit for MaineCare enrollees was 44 per 1000 compared to 12 per 1000 for privately insured Mainers. Hospital administrators may have incentives to provide assistance in applying for MaineCare coverage to low-income uninsured ED users since MaineCare, even retroactively, is a source of revenue for services that would otherwise be provided as charity care. This dynamic would substantially increase the odds of MaineCare enrollment for high risk individuals compared to healthy eligible individuals who have no contact with the health care system. Thus, the risk profile of the MaineCare program may be substantially worse than that of the privately insured (many of whom get their health coverage 'automatically' through their place of employment.

Health Service Area Variation

There is substantial variation in the rate of use of emergency departments by health service areas in Maine, with the highest use area having a population rate 2 ½ times the rate of the lowest use area. Generally, rural areas tend to have higher use rates than urban areas in the state, but the relationship is not absolute. Variation among rural areas is substantial and, while not so dramatic, rates among Maine's cities vary from 359 outpatient visits per 1000 to 508 per 1000. Having a high concentration of MaineCare residents and, by implication, a high rate of poverty in a service area contributes to raising the average ED rate of use but this demographic

factor does not explain much of the variation. The fact that there is substantial regional variation *within* the MaineCare population and within the privately insured population points to region-specific factors that influence rates of use. This conclusion is further supported by the substantial overlap between high use and low use areas across the two populations.

Preventable Visits

The review of the diagnoses associated with ED visits revealed that for thousands of visits, the primary complaint was a condition frequently treated in an office setting. This factor, plus the fact that peak use of EDs occurs on weekends, Mondays, during morning hours, and between 6 and 7 PM, all suggest that many patients use the ED for urgent – but not emergency – care because they can get medical attention more quickly than through making an appointment with an office-based provider.

Conclusions

The data suggest that there are multiple factors that contribute to Maine's high ED use rate and that more than one dynamic is at play. The following factors appear to be contributing to the problem and may merit further investigation or the development of an intervention.

- Many of the frequently seen diagnoses, the temporal patterns of ED visits, and the unusually elevated rates of use in age groups that normally use health care services infrequently (5 to 14 and young adults) all point to the use of EDs for primary care or urgent care needs that could be met in office or clinic settings. The use of EDs for non-emergency care could arise from a number of factors including a shortage of primary care providers in some areas, non-availability of urgent or primary care outside of school and work hours, lack of availability of telephone consultation, long waiting times for appointments with office-based providers, or habitual care-seeking patterns of patients without an established relationship with a provider.

  Because of the variation in use rates by service area, a comparative case study approach of high and low use areas would provide additional information on health system factors that contribute to or ameliorate the problem of high ED use.

- The MaineCare population has consistently higher ED use rates than other populations in Maine. This dynamic suggests barriers to care in alternative settings that are specific to this population. It is possible that MaineCare enrollees face additional barriers to office-based care because some providers do not accept Medicaid reimbursement and others limit the number of MaineCare recipients they will accept. Some MaineCare members may have greater transportation difficulties or work in jobs with inflexible hours where taking time for a doctor's appointment is not possible. It is also possible that some or many MaineCare recipients prefer care in an ED setting if they have been treated rudely or coldly by staff in an office setting.

  These questions can best be answered by making systematic inquiries among MaineCare members, primary care providers, and ED providers and administrators.

- Individuals who use the emergency department frequently contribute to the problem of high use rates and represent a separate challenge in terms of interventions. The analysis shows that frequent users in Maine are most prevalent among infants and young adults and that they are present in every health service area. A separate study of Maine's MaineCare population showed a strong association in this group between mental health and substance

abuse diagnoses and high ED use.[21] It showed that among MaineCare members with a mental health diagnosis, 44 percent used the emergency department between 1 and three times, and over 14 percent used the ED four or more times. Among individuals with both a mental health diagnosis and an addiction, more than a third had four or more ED visits.[*]

These suggestive but incomplete findings point to the need for more information. An analysis of all adult frequent users that examines the range and distribution of diagnoses as well as this population's use of other health care services such as office or clinic visits and prescription medications might allow the development of one or more profiles suggesting intense and programmatic interventions.

[*] This study included just MaineCare members. We do not know what the comparable associations between mental illness, substance abuse, and ED use are among other populations such as the privately insured or the uninsured.

APPENDIX 1

EMERGENCY DEPT. USE WORKGROUP

Trish Riley, Chair	Director, Governor's Office of Health Policy
Tim Beals	Executive Director, Delta Ambulance
Art Blank	President/CEO, Mt. Desert Island Hospital, Member ACHSD
Jay Bradshaw	Public Safety Manager, Emergency Medical Services
Rev. Bob Carlson	President, Penobscot Community Health Care
Carol Carothers	Executive Director, NAMI-Maine
Dr. Ken Christian	Chief of ED, Maine Coast Memorial Hospital
Dr. Josh Cutler	Director, Maine Quality Forum, Member ACHSD
Bob Downs	Director of Operations and Development, Harvard Pilgrim Health Care
Geoff Green	Deputy Commissioner, DHHS
Chris Hastedt	Public Policy Advisor, Maine Equal Justice Partners
Dr. Scott Kemmerer	Medical Director, Emergency Dept., MaineGeneral Medical Center
Dr. Maroulla Gleaton	Ophthalmologist, Member ACHSD
Anne Graham	Maine Neurology, Member ACHSD
Katie Fullam Harris	Director, Government Relations, Anthem Blue Cross Blue Shield
Tony Marple	Director, OMS, DHHS
Carol Minnis	ER Nurse, Waterville Campus of MGMC
Deb Nichols	Schaller Anderson
Dr. Brian Rines	Psychologist, Chair ACHSD
Dr. Erik Steele	Chief Medical Officer, Eastern Maine Healthcare Systems
Ron Welch	Director, OAMHS, DHHS
Dennise Whitley	Director of Advocacy-Maine, American Heart Association
Richard Willett	CEO, Redington-Fairview General Hospital
David Winslow	Vice President of Financial Policy, Maine Hospital Association
Dr. Wendy Wolf	President and CEO, Maine Health Access Foundation

GOHPF Staff
Peter Kraut
Jude Walsh

CONSULTANT
Beth Kilbreth, Associate Research Professor, Muskie School of Health Policy

APPENDIX 2

Maine Emergency Department Visit Study, 2006
Methods: Technical Specifications
Prepared by Karl Finison

Data Sources.

Four data sources were used for this study.

1) Maine hospital discharge inpatient data (all payers and uninsured)

2) Maine hospital outpatient data (all payers and uninsured)

3) Claims and Enrollment Data (Commercial Payers)

4) Claims and Enrollment Data (MaineCare-Medicaid).

Data were extracted for 2006 dates of service 1/1/2006-12/31/2006. 2006 was the most complete year of data available at the time of the study.

This study was restricted to residents of Maine. Visits to Maine hospitals by residents of other states or countries were not included.

Defining Emergency Department and Office-Clinic Visits.

1) Emergency department visits were selected based on standard coding: UB (Uniform Billing) Revenue Codes 450-459,981 or CPT codes 99281-99285. This definition was derived from the National Committee for Quality Assurance (NCQA) Health Effectiveness Data Information Set (HEDIS). HEDIS 2007 Technical Specifications. Volume 2. National Committee for Quality Assurance. www.ncqa.org

This method of selecting emergency department visits was reviewed with the study workgroup prior to the generation of reports.

Outpatient emergency department visits (did not result in hospitalization) and emergency department visits that resulted in hospitalization were also reported separately.

2) Office/Clinic Visit Definition. Identification of office-clinic visits was available from the claims data. Including office-clinic visit rates in this study was potentially useful in contrasting areas with high emergency department use and low office-clinic visit use. Office or Clinic visits were identified based on Common Procedural Terminology (CPT) codes: 99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, 99215, 99354, 99355, 99381, 99382, 99383, 99384, 99385, 99386, 99387, 99391, 99392, 99393, 99394, 99395, 99396, 99397, 99401,

99402, 99403, 99404, 99411, 99412, 99420, 99429, 99432, T1015, 99241, 99242, 99243, 99244, 99245 or UB revenue codes 510-519, 520-529, or 983. The definition was based on codes found in NCQA HEDIS specifications plus additional codes for rural health centers and federally qualified health centers. Additional MaineCare local codes for FQHC and Rural health codes: FQH3, FQH4, FQH5, FQHC, RHC, RHC2, RHCCP.

3) Counting Visits and Persons. After selection, counts of emergency department visits were made by unduplicating by the person ID and date of service. Counts of persons were made by unduplicating by person ID. While the claims data sources contain a unique person ID, the MHDO hospital data sources do not. The MHDO hospital data source does contain a scrambled medical record number that is unique within a hospital. Therefore person counts from the MHDO hospital data represent unique persons within a hospital. If a person visited an emergency department at one hospital and then the emergency department at a different hospital (e.g. transfers) that person would be counted twice in the MHDO hospital reporting.

4) Member Assignment for Claims Data Analysis. Because members may change age, location of residence, or eligibility grouping during the year, each member was assigned to one and only one category for reporting. Their eligibility group and Health Service Area on the last day of the last month enrolled and their age on the first day of the last month enrolled were used. This methodology is consistent with other client reporting developed by the Maine Health Information Center.

Stratification of Data.

Emergency department visits and rates were tabulated by age group, gender, Hospital Service Area (H.S.A.) of residence, and payer.

1) Age groups used were: <1, 1-4, 5-9, 10-14, 15-18, 19-20, 21-24, 25-34, 35-44, 45-49, 50-54, 55-59, 60-64, 65-74, 75-84, 85+. A member age 18 was considered a child for this reporting which is consistent with Medicaid eligibility purposes.

2) Maine Hospital Service Area (HSA) definitions were developed under a project coordinated by the Maine Health Data Organization during 2004. Hospital Service Areas are relevant to how health care is delivered in Maine compared to counties. They include the towns surrounding a hospital location were the plurality of care is received at that hospital. There are 32 hospital service areas in Maine. The reporting from the MHDO hospital data source may have low rates for the York H.S.A. because use of New Hampshire hospitals is not included in the MHDO data source. The claims data sources (Commercial, MaineCare) do not have this issue because all services are included regardless of location of provider.

3) Expected Source of Payment. From the MHDO hospital data source, the expected source of payment coding was aggregated into five groups as follows: Medicare (1),
Medicaid(2,3), Commercial (5,6), Uninsured (7,8), Other (4,9,11). Other includes Workers Comp and Champus/USVA Military. Medicaid(MaineCare) is payer of last resort. Therefore, persons with dual Medicaid/Medicare status would be identified as Medicare as principal source of payment not Medicaid.

Reporting from the MaineCare claims data was further stratified by enrollees with MaineCare-only coverage, members with additional third-party coverage, and members with dual-Medicare coverage.

4) Clinical Diagnoses and Clinical Classification Software (CCS)

The clinical causes of outpatient ED, office-clinic, and ED resulting in inpatient hospitalization were assigned using the ICD-9-CM (International Classification of Diseases, Ninth Revision) diagnosis on the administrative claims. Emergency department visits were reported by individual 5-digit diagnosis code and a 3-digit roll-up of diagnosis codes. Emergency department visits were also aggregated into 260 clinically meaningful groupings using the Clinical Classification Software (CCS) for ICD-9-CM from the Agency for Healthcare Research and Quality (AHRQ). One example, CCS 92 Otitis media and related conditions, is provided below.

Procedure	ICD-9-CM codes
92 Otitis media and related conditions	381.00, 381.01, 381.02, 381.03, 381.04, 381.05, 381.06, 381.10, 381.19, 381.20, 381.29, 38.13, 38.14, 381.50, 381.51, 381.52, 381.60, 381.61, 381.62, 381.63, 381.7, 381.81, 381.89, 381.9, 382.00, 382.01, 382.02, 382.1, 382.2, 382.3, 382.4, 382.9, 383.00, 383.01, 383.02, 383.1, 383.20, 383.21, 383.22, 383.30, 383.31, 383.32, 383.33, 383.81, 383.89, 383.9, 384.20, 384.21, 384.22, 384.23, 384.24, 384.25, 384.81, 384.82, 384.9, 385.00, 385.01, 385.02, 385.03, 385.09, 385.10, 385.11, 385.12, 385.13, 385.19, 385.21, 385.22, 385.23, 385.24, 387.0, 387.1, 387.2, 387.8, 387.9

Clinical Classifications Software (CCS) for ICD-9-CM. Agency for Healthcare Research and Quality (AHRQ). The Healthcare Cost and Utilization Project (HCUP).
http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp#download.

Population-Based Rates

1) Denominators for Rates. For the MHDO hospital data, the population denominators used in this study to generate rates were based on population estimates provided by the Maine Office of Data, Research and Vital Statistics by age, gender, and town code – aggregated to Hospital Service Areas. Estimates were from 2005 because 2006 estimates were not available at the time of reporting.

There is no source for population denominators by payer type for Maine. Payer specific population denominator estimates for use with the MHDO hospital data were based on estimates derived from work of another project, Maine HealthInfoNet.

For the claims-based analyses, the denominators are based on months of enrollment from the enrollment files. Not all members are covered for a full year. Therefore, a person covered for a full 12 months would be twice as likely to have an ED visit during the year compared with a person covered for only 6 months. Standard methods were used to adjust the denominators for these differences in exposure time. Thus, average members (cumulative member months divided by 12) was utilized as denominator for rates in this study.

Rates are reported as per 1,000 population.

2) Standardization of Rates

Standardization of rates for age differences was made in the comparisons of the geographical Hospital Service Areas. The indirect method of age standardization was used and is the preferred method for standardization of rates for geographical analysis of small areas such as the HSAs used in this study. For age-standardized rates, confidence intervals were computed using methods described by Breslow and Day for indirect standardized rates.

Breslow NE and Day NE. Statistical Methods in Cancer Research. Volume II – The Design and Analysis of Cohort Studies. World Health Organization. 1987.

National Comparative Data Source

2006 comparative national emergency department visit rates were taken from a CDC report. The rates include both outpatient emergency department visits and emergency department visits resulting in hospital admission.

National Hospital Ambulatory Medical Care Survey: 2006 Emergency Department Summary. Table 2. National Health Statistics Reports. Number 7. August 6, 2008. http://www.cdc.gov/nchs/data/nhsr/nhsr007.pdf

This national data is based on a national sampling. Table 1, of the report indicate that 84.5 percent of the ED visits in the sample are located in metropolitan statistical areas or MSA and 15.5% of ED visits nationwide were from "rural" areas (i.e. not located in a metropolitan statistical area or MSA). Therefore, comparisons made in this report do not reflect how Maine compares to similar rural states but to the nation as a whole.

APPENDIX 3

ANALYSIS OF THE IMPACT OF INCLUSION OF "URGI-CENTER" VISITS IN OUTPATIENT EMERGENCY DEPARTMENT VISIT COUNT

The NCQA HEDIS standard for selection of emergency department visits includes UB revenue code 456 Urgent Care may be used to bill for hospital "urgi-center" visits. Some researchers elect to exclude these visits from study. In prior studies of Maine emergency department use, medical directors from Maine hospitals had indicated that these types of visits should not be excluded. The occurrence of this type of visit was evaluated and found to represent about 9 percent of all 2006 Maine outpatient emergency department visits and were exclusively at Maine Medical Center, MaineGeneral (both campuses) and Southern Maine Medical Center hospitals. The potential impact of removing these visits would be to lower the rates of outpatient emergency department visits for the Portland, Biddeford, Augusta, and Waterville Hospital Service Areas. (See page 2 for detail)

END NOTES

[1] The official Site of National Center of Health Statistics Data on Emergency Department visits (http://www.cdc.gov/nchs/about/major/ahcd/ercharts.htm)

[2] Hospital-Based Emergency care (prepublication copy); *Institute of Medicine of the National Academies* (study staff/2003-2006), http://pub.ucsf.edu/today/daily/2006/06/hosbased.pdf

[3] *Institute of Medicine,* 2006.

[4] *Institute of Medicine,* 2006

[5] *Institute of Medicine,* 2006

[6] Nawar EW, RW Niska and J Xu. 2007. National Hospital Ambulatory Medical Care Survey: 2005 Emergency Department Summary. Advance data from vital and health statistics; no. 386. Hyattsville, MD: National Center for Health Statistics.

[7] Billings J. N., Parikh T. M., *Emergency Room use*: *The New York Story,* 20

[8] The official Site of National Center of Health Statistics Data on Emergency Department visits (http://www.cdc.gov/nchs/about/major/ahcd/ercharts.htm)

[9] Cunningham P. J., May J.H. Insured Americans Drive Surge in Emergency Department Visits, *Center for Studying Health System change, issue brief* #70, 2003

[10] Weinick R.J., Burstin B. H., *What is the role of primary care in emergency department overcrowding?*

[11] Weinick R.J., Burstin B. H

[12] Guttman, N., DR Zimmerman and MS Nelson. 2003. The many Faces of Access: Reasons for Medically Nonurgent Emergency Department Visits. *Journal of Health Politics, Policy and Law,* 23(6):1089-1120.

[13] Maine Health Information Center. 2007. Emergency Department Use Among State of Maine Employees.

[14] HEDIS 2007, Technical Specifications. Volume 2. National Committee for Quality Assurance. www.ncqu.org

[15] HEDIS 2007, Technical Specifications. Volume 2. National Committee for Quality Assurance. www.ncqu.org

[16] LJ Cook, S Knight, E Junkins, NC Mann, JM Dean, LM Olson. Repeat Patients to the Emergency Department in a Statewide Database. Academic Emergency Medicine 2004; 11:256-263; Frequent Outpatient Emergency Department Use by New Hampshire Medicaid Members. An Evaluation of Prevalence, Diagnoses, Utilization, and Payments. New Hampshire Department of Health and Human Services, October, 2008. http://www.dhhs.state.nh.us/DHHS/OMBP/LIBRARY/Data-Statistical+Report/emergencyroom.htm

[17] Population estimate based on 2005. 2006 data is not yet available.

[18] The official Site of National Center of Health Statistics Data on Emergency Department visits (http://www.cdc.gov/nchs/about/major/ahcd/ercharts.htm National data does not break out outpatient ED visits from ED visits resulting in a hospitalization.

[19] Total population data and distribution by payer taken from 2005 data.

[20] Nawar, EW, RW Niska, and J Xu. 2007. National Hospital Ambulatory Medical Care survey: 2006 Emergency Department Summary. Advance Data from Vital and Health statistics 386. U.S. Department of Health and Human services, Centers for Disease Control and Prevention.
[21] Freeman, Elsie, "Person Centered Approach to Assessing ER Usage: The Impact of Behavioral Disorders on Health Risk, Chronic Disease and Utilization of Services. " Presentation to ED Use Work Group, Nov. 12, 2008.